screen printing a suitable ink into the channel or opening to [a desired thickness] fill the channel or opening.

9. A method of making buried passive components in a multilayer green tape stack comprising

a) embossing an opening of a desired shape and size using an embossing tool and heat and pressure sufficient to transfer the pattern from the embossing tool to the green tape directly [on] into the surface of a green tape;

b) filling said opening by screen printing with an ink including said component material;

c) burying said green tape in a green tape stack;

d) aligning and laminating said stack onto a metal support board coated with a low melt temperature glass; and

e) firing said stack to remove organic materials and to densify the glass of the green tape.

11. A method according to claim [10] 9 wherein said support board is of metal.

Cancel claim 10.

REMARKS

The claims are 1-7, 9 and 11. A clean copy of the claims is attached hereto.

Claims 1-3 have been rejected as unpatentable over IBM of August 1974 in view of IBM of April 1974. This rejection is respectfully traversed.

The claims as amended require embossing a channel into a green tape using an embossing tool and a temperature and pressure so as to transfer the pattern of the embossing tool into a surface of a green tape, and screen printing an ink into the channel to fill the channel.

The August, 1974 IBM reference discloses creating openings in a green tape; filling some of the openings, or partially filling the openings with an ink that does not volatilize at lamination temperatures, but that does volatilize at the firing temperatures of the glasses used to make the green tape. Thus during the firing step, air gaps 5 (Fig. 1) and 9 (Fig. 2) form in the green tape. The present claims require that embossed channels or openings be filled with a screen printed ink. Thus there are no air gaps in the green tapes or green tape stack of applicants. Further, as the Examiner concedes, neither embossing

nor heat nor pressure is disclosed for forming the openings or channels.

IBM of April, 1974, hot stamps an indentation in a green tape and then screen printed. However, as applicants have pointed out in the past, the green tape is adhered to a Mylar tape with a PVA coating. When the Mylar tape is peeled off, the PVA strongly adheres to the green tape. The pattern is pressed using low temperatures and pressure (70°F and 400 psi) into this PVA layer, rather than directly onto the green tape as required herein. The pattern is filled with an ink that is made from an organic vehicle that does not attack the PVA film under lamination conditions. Thus this PVA layer is intact when this top green tape layer is laminated to other green tapes. The PVA however, being an organic material, will volatilize when the green tapes are heated to temperatures that densify the glass of the green tapes. Just how the PVA layer volatilizes, whether it forms bubbles in the green tape, or the top layer de-laminates, is not discussed. But it is clear that some gap or bubbles will be present between the top fired green tape layer and the remaining fired green tape layers.

Claims 2 and 3 already require filling the channels with a

conductive ink.

Thus applicants submit the product obtained using the method of IBM is not the same as that obtained by applicant, in that no air gaps or irregularities in the space between the top layer and the remaining layers will be formed using the present method.

The two IBM references are incompatible as to the products obtained. Thus applicants submit it would not be obvious to substitute one step of the method from one reference for a different step in a second reference to obtain a different product, and this rejection should be withdrawn.

Claims 4-7 and 11 have been rejected over the IBM references in view of Vitriol. The two IBM references have been discussed above.

Vitriol et al disclose a conventional multilayer green tape stack having circuit patterns screen printed on the various layers, with the exception that the green tape stack is heated sufficiently to make the green tapes plastic or flexible, so they can be bent to various shapes. No embossing of the circuitry patterns is disclosed or suggested. Thus this reference does not suggest the present methods as claimed. No reason to combine Vitriol with the IBM references is suggested either. Thus

applicants submit this rejection is made in the light of hindsight, after considering the present application, which is improper.

Applicants concede that built-in capacitors, as claimed in claims 6 and 7, are known to those skilled in the art.

Claims 9 and 10 have been rejected as unpatentable over the IBM references in view of Prabhu '724. Prabhu discloses multilayer ceramic layers on a metal support board. A thin layer of a low melting point glass is applied to the support board to enhance adhesion of the multilayer ceramic to the support board. However, Prabhu does not disclose or suggest embossing patterns in the green tape, but only conventional screen printing of circuit patterns onto the surface of the green tape layers using a conductive ink. Thus neither of steps a) or b) of claim 9 are suggested by Prabhu.

The Examiner acknowledges the submission of a Declaration by Dr. Thaler. The mold release agents used by the industry are not polymeric materials, but generally lower molecular weight oils. Thus applicants do not agree that the present claims preclude the application of a mold release agent; the PVA of the reference is described as a thin, smooth uniform film, not a mold release

agent. The reference to Schmeckenbecher describes a mask forming material which is non-wettable by a metal-containing ink, which can be a PVA layer.

In view of the above amendments and discussion, applicants submit the present claims are in condition for allowance. Thus reconsideration of the rejections and allowance of claims 1-7, 9 and 11 are respectfully solicited.

A clean copy of all of the claims follows.